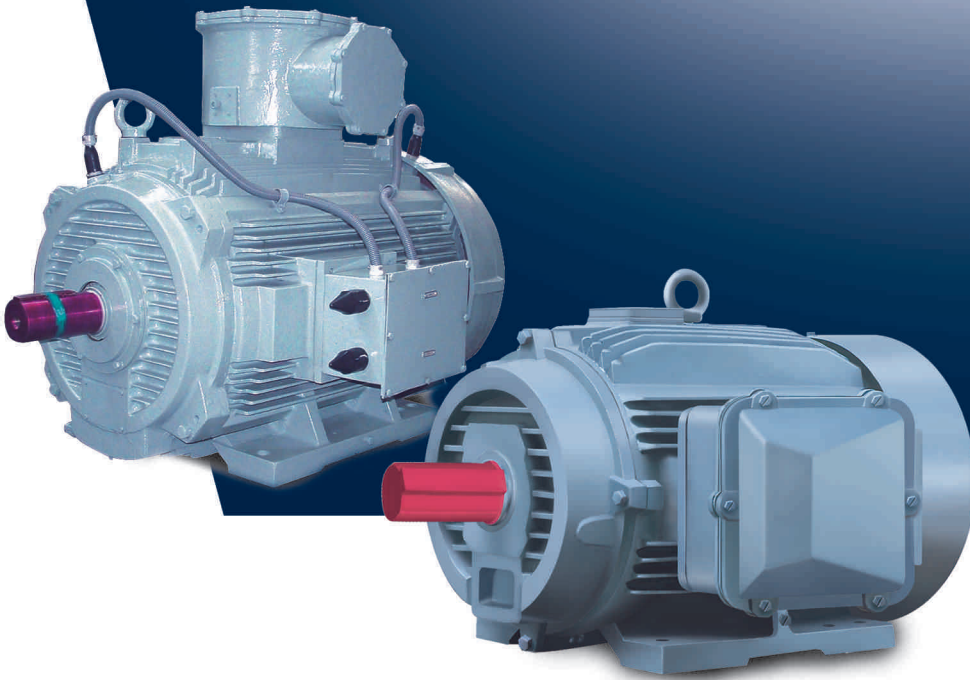




**marathon**<sup>™</sup>  
Motors



## Challenger

**Totally Enclosed Fan Cooled Low  
Voltage Cage Induction Motors  
Includes IE2**

A Regal Brand

**REGAL**

[www.regalbeloit.com](http://www.regalbeloit.com)

MARATHON Electric presents CHALLENGER Series TEFC Squirrel cage motors with excellent product features and outstanding performance parameters. The design of this range is based on advanced technical knowhow and the level of excellence associated with this international company manufacturing motors in India for more than half a century. Stringent quality control procedures are adopted at each stage of production as a part of the company policy to ensure that each motor is manufactured to the requisite quality standard ensuring customer satisfaction.

### Rating

A.C. low voltage TEFC Sq. cage Induction motor.

### Frame size-71-355L

(designated as 12D71 - 12D355L for Challenger Series)

### Output-

2 Pole - 0.37 kW - 200 kW  
 4 Pole - 0.25 kW - 400 kW  
 6 Pole - 0.55 kW - 315 kW  
 8 Pole - 0.37 kW - 250 kW

### Supply Voltage and Frequency

The Motors can be wound for any voltage from 200 volt to 690 volt and for either 50 Hz or 60 Hz frequency. Standard motors are wound for 3 phase, 415 volt, 50 Hz supply condition.

All standard 50 Hz motors may be operated with 60 Hz supply at same voltage for same output. However, if the supply voltage at 60 Hz is 10-20% higher than rated voltage of the motor, output can be increased by 10-15% depending on frame size/speed.

The Motors can also be supplied for dual voltage operation or for operation with variable voltage and variable frequency supply(VVVF), or for operation over a wide voltage range. Separate 'VD' series of motors suitable for VVVF drive are specially designed to withstand higher dielectric strength to combat voltage surges originated from high switching frequency with IGBT drives.

The supply voltage is assumed to be virtually sinusoidal and balanced as defined in IS 325.

### Standards

Challenger Series conforms to the following national and international standards.

Standard	Indian IS	International	
		IEC	NEMA*
Dimensions	IS 1231 IS 2223	IEC 60072 - 1	MG1 Part 4
Performance	IS 325	IEC 60034 - 1	MG1 Part 12
Output	IS 1231	-	MG1 Part 10
Protection	IS 4691	IEC 60034 - 5	MG1 - 1.26B
Mounting	IS 2253	IEC 60034 - 7	MG1 Part 4

Motors Complying with IEC-60034-1 also comply with many national standards of European Countries. Motors suitable for NEMA standards duly approved by CSA/NRTL(C) and motor with CE marking are also manufactured. For full details of motors as per NEMA standard CE marking, refer to MARATHON Electric.

Standard motor complies to

Optional

### Supply and Site Conditions

Standard motors are suitable for operation with variation in supply and site conditions as indicated in Table 1 :-

In the event of sustained operation at extreme limits of supply variation the temperature rise may exceed by 10°C.

For other site conditions motor output should be adjusted as per Tables 2 & 3.

When both ambient temperature and site altitude differ from standard, the approximate permissible output is obtained by multiplying the factors against each variable as indicated in Tables 2 & 3.

TABLE - 1

Ambient Temp.	Altitude	Voltage Variation	Frequency Variation	Combined Variation
50°C*	" 1000 Mtrs.	± 10%	± 5%	± 10%

Table - 2

Deration For High Ambient Temp.

Ambient Temp.	50°C	55°C	60°C	65°C	70°C	80°C
Class 'B' Temp. Limit	100%/95%*	90%	85%	80%	70%	60%
Class 'F' Temp. Limit	100%	100%	95%	90%	80%	70%

TABLE - 3

Deration For Altitude

Altitude	1500 m	2000 m	2500 m	3000 m	3500 m	4000 m
Class 'B' Temp. Limit	95%	91%	87%	83%	79%	74%
Class 'F' Temp. Limit	100%	100%	95%	90%	85%	81%

\* For motor as per exceptions in 'Performance Chart', the applicable ambient temperature would be 45°C with deration as 95% for 50°C ambient temp.



**Insulation and Temperature Rise**

Standard motors will operate satisfactorily in an ambient temperature range -20°C to +50°C\* with class B temperature rise and altitude up to 1000 meters above sea level. The use of class B temperature rise (70°C) ensures an exceptional margin of safety and longer life even in abnormal operating conditions. Standard motors will withstand ambient temperatures up to 55°C OR 10% overload OR adverse supply systems. Motors will Class 'H' insulation or higher may be supplied as an optional.

**Duties**

Standard motors are suitable for operation with continuous running duty (S1) suitable for maximum 3 cold starts or 2 hot starts in succession under rated load conditions provided that a period of 30 minutes elapses before another starting sequence is attempted. Motors to suit other duty conditions e.g. S2 – S9 may be offered on request.

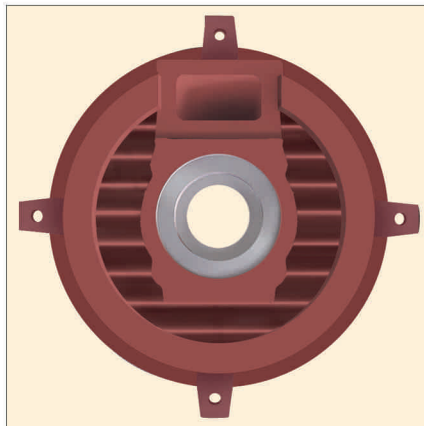
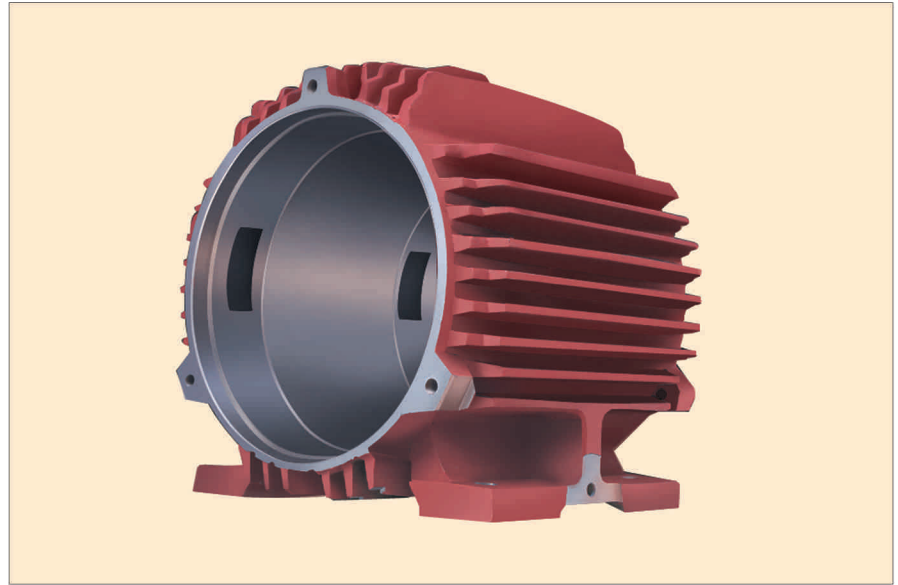
**Performance**

Challenger series offers outstanding performance parameters. The parameters are better than those recommended in IS 8789/Eff2 (Improved efficiency) as per IS 12615 (2004)\*. Energy efficient motors complying to Eff1 (High efficiency) parameters in accordance with IS 12615 (2004) and CEMEP (European Committee of Manufacturers of Electrical Machines & Power Electronics) / IE2 as per IS:12615 (2011) are available on request under 'SE' series. Refer to table for 2, 4 & 6 poles on pages 11 & 12. For 4 pole motor, Challenger+ designs offer better efficiency than standard eff.2 motor. Refer to last table on page 12. While ordering for Challenger+, please indicate accordingly.

**Constructional Features**

**Frame**

Stator frames are made of elegant looking, rugged cast iron enclosure. Foot mounted motors are provided with integrally cast feet. Maximum cooling surface is obtained by quadrangular disposition of cooling ribs.



**End bracket**

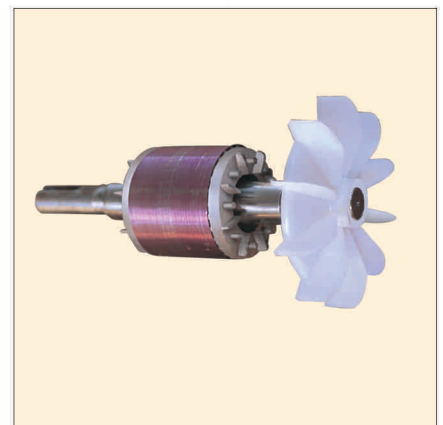
Ribbed end brackets are provided from frame sizes D160 upwards. For frame sizes upto D225S single piece endbracket is used eliminating outer bearing cap. For frame sizes D200L and above, Challenger Series offers another unique feature of grease relief arrangement as standard. Grease nipple is provided as standard and located on rim of endbracket facilitating easy regreasing in service.

The terminal box location on the frames are as follows :

Frame Size (s)	Terminal box location	Remarks
D80-250 M	Side	Reversible frame housing offering terminal box position at RHS or LHS when viewed from DE side. Motors with Top T.Box frames are also available and can be offered if specified.
D280S/M	Side (Two openings)	Default RHS, can be converted to LHS if required, as there is another option on LHS. Motors with Top T. Box frames can be offered if specified.
D315 – D355L	Side/Top	Default RHS. LHS/Top can be provided as the frame has three optional terminal box position.

**Cooling Fan**

All fans are bidirectional. Optimum cooling air flow for efficient heat transfer is ensured by the design of fan and cowl. Motors in this series have been specially designed for



\* Refer to 'Performance Chart' for exceptions.

reduced noise level to satisfy present-day industry requirements.

For D71-D200L nylon fan is used as standard. For D225S-D280M either nylon or aluminium alloy (LM6) fan with C.I. insert is used. For all motor in frame size D315/D355 except 2 pole motors, aluminium alloy (LM6) fan with C.I. insert is used. For 2 pole motors in these frame sizes fabricated MS, fan is used. Optional unidirectional fan is also available for 2 pole application.

### Shaft and Rotor

Standard shafts are machined from C45 grade of carbon steel. All shaft diameters are machined to fine limits. For ease of fitting, removing or securing fitments an axially tapped hole at drive end of shaft is provided as standard. Standard motors have a single cylindrical shaft extension with keyway. Double cylindrical/non-standard shaft extensions are available on request. The rotor core is produced from high quality electrical grade insulated sheet steel lamination. Challenger Series offers Aluminium die-cast rotor for entire range of motors.

### Windings

The integral system of wire insulation, slot and phase insulation and the overall varnish impregnation provides tracking protection together with a winding rigidity that is capable of withstanding the vibration limits imposed by industrial drives. For highly corrosive atmosphere, special winding treatment is provided against specific order.

### Terminal Box

Standard motors are provided with terminal box positioned at RHS looking from DE side. Terminal box in all motors are of generous size for ease of connection and maintenance. Terminal box may be rotated

in steps of 90° providing four alternative direction of cable entry in all frame sizes.

Cable sizes for standard terminal box arrangement are given in Table 4. Terminal box suitable for higher cable sizes is available on request.

### Mounting Arrangement

Standard motors are manufactured with horizontal foot mounted construction (IMB3) with single cylindrical shaft extension at D.E. side. Following Mounting options are available :-

#### Horizontal shaft Motors :-

Code I	IM B3	IM B5	IM B6	IM B7	IM B8	IM B14	IM B34	IM B35
Code II	IM 1001	IM 3001	IM 1051	IM 1061	IM 1071	IM 3601	IM 2101	IM 2001



#### TYPES

71								
80								
90								
100								
112								
132								
160								
180								
200								
225								
250								
280								
315								
355								

#### Vertical Shaft Motors :-

Code I	IM V1	IM V3	IM V5	IM V6	IM V15	IM V18	IM V19	IM V36
Code II	IM 3011	IM 3031	IM 1011	IM 1031	IM 2011	IM 3611	IM 3631	IM 2031



#### TYPES

71								
80								
90								
100								
112								
132								
160								
180								
200								
225								
250								
280								
315								
355								

Standard Construction Consult us; specify the coupling method and any axial loads Not covered



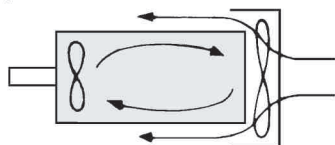
Table - 4

FRAME SIZE	STUD SIZE	MAX CABLE SIZE	DOWELL'S CAT. NO.
71 - 90	M5	1 NO. 3C X 4 mm <sup>2</sup>	CUS/06
100 - 132	M6	1 NO. 3C X 6 mm <sup>2</sup>	CUS/07
160 - 180	M6	1 NO. 3C X 35 mm <sup>2</sup>	CUS/11
	M6	1 NO. 3C X 50 mm <sup>2</sup>	CUS/13
200 - 225	M12	1 NO. 3C X 70 mm <sup>2</sup>	CUS/18
250 - 280	M12	1 NO. 3C X 185 mm <sup>2</sup>	CUS/25, 20
315	M12	2 NOS. 3C X 185 mm <sup>2</sup>	CUS/29
	M12	1 NO. 3C X 300 mm <sup>2</sup>	CUS/29
355	M12/M16	2 NOS. 3C X 300 mm <sup>2</sup>	CUS/27

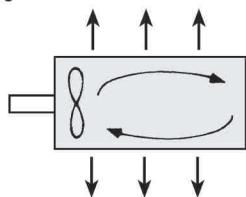
### Cooling Forms

The standard cooling arrangement is IC 411 in accordance with IS 6362 defined as totally enclosed fan cooled over an externally ribbed surface with free movement of internal air by rotation of rotor blades. Alternative cooling forms e.g. airstream ventilated (IC 418) and totally enclosed surface cooled (IC 410) are also available.

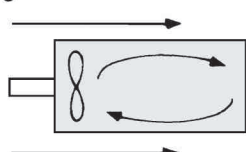
IC 411



IC 410



IC 418



### Degree of Protection

Challenger series of motors are provided with IP55 degree of protection as standard. IP56 degree of protection may be provided on request.

### Vibration limits

All rotors are dynamically balanced with half key to ensure normal class vibration level as per IS 12075.

### Noise Level

Challenger Series have been designed to achieve low noise level over the whole range of speeds on outputs. Challenger Series conform to the noise level requirement as per IS 12065. Reduced noise levels may be offered on specific enquiry.

Noise level is normally specified as mean sound pressure level measured at one meter from the surface of the motor and is expressed as dB(A) referred to a base pressure of  $2 \times 10^{-5} \text{N/m}^2$ .

### Overspeed

All standard motors will continuously withstand a mechanical overspeed of 120% rated speed.

### Momentary overload

Standard motors will withstand a torque equivalent to 1.6 times rated load torque for a time not exceeding 15 seconds, provided the supply is maintained at the rated values.

Normally, the pull-out torque significantly exceeds this overload torque.

### Termination/connection

#### Starting

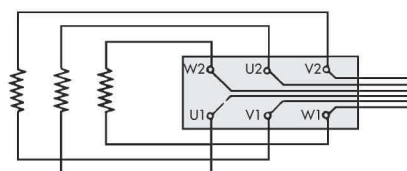
For motors up to 2.2 kW rating, winding is connected internally in STAR and 3 terminals are brought out for termination for D.O.L starting.

For motors of higher ratings, six terminals are brought out to suit either STAR/DELTA or D.O.L starting. Shorting links are provided as standard for all frames.

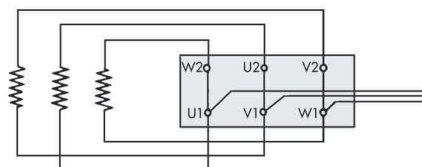
#### Terminal Marking

Motor terminals are identified as per IS 4728.

#### STAR/DELTA STARTING (6 TERMINALS)



#### DIRECT-ON-LINE STARTING-DELTA (6 TERMINALS)



#### Special Terminations

Loose flying leads without terminal board assemblies can be provided on request. Series/parallel connections can also be provided against specified enquiries.

#### Rotation

Standard rotation is clockwise when viewed from drive end of the motor. Standard rotation is obtained when the alphabetical sequence of the phase groups correspond to the time sequence of the supply connected to terminals.

#### Earthing

2 Nos. earthing points are provided one on each side of frame.

### External Finish

Motors are provided with synthetic enamel finish paints. All cast-iron/ steel components are provided with a coat of epoxy zinc phosphate primer over fettled and shot blasted components.

To ensure good corrosion resistance in highly corrosive atmosphere, motors may be provided with chlorinated rubber base paint or epoxy base paint on request.

### Anti-condensation Heating

For motors remaining idle under severe cold climatic condition or under highly humid atmosphere use

of anti-condensation heating is recommended.

The heating serves to maintain the average temperature inside the enclosure at a level so as to avoid condensation. THE HEATING MUST BE SWITCHED OFF WHILE MACHINE IS IN OPERATION.

For motors up to 7.5 kW rating 2 terminals of either STAR or DELTA connected winding may be connected to 1 phase, 24 volts, A.C. supply for anti-condensation heating. For higher rating separate space heaters are provided, with termination in separate terminal box.

### Bearings

Metric size ball/roller bearings are

used in horizontal foot mounted motors. For frame sizes up to D315L ball bearings are used at both ends. To cater to greater radial load, if necessary, roller bearing can be incorporated at the drive end by means of a simple conversion.

Ball bearings have C3 clearance. For frame size D355 roller/ball bearings are used at DE/NDE side respectively.

Grease relief arrangement is provided as standard for motors in frame size D200 and above. Bearing details are given in Table 6. For axial and radial load details works may be referred.

**TABLE - 6  
BEARING DATA**

FRAME SIZE	POLES	HORIZONTAL MOUNTING		VERTICAL MOUNTING	
		DRIVE END	NON-DRIVE END	DRIVE END	NON-DRIVE END
71	ALL	6203ZZ C3	6203ZZ C3	6203ZZ C3	6203ZZ C3
80	ALL	6204ZZ C3	6204ZZ C3	6204ZZ C3	6204ZZ C3
90	ALL	6205ZZ C3	6204ZZ C3	6205ZZ C3	6204ZZ C3
100	ALL	6206ZZ C3	6205ZZ C3	6206ZZ C3	6205ZZ C3
112	ALL	6206ZZ C3	6205ZZ C3	6206ZZ C3	6205ZZ C3
132	ALL	6208ZZ C3	6207ZZ C3	6208ZZ C3	6207ZZ C3
160	ALL	6309ZZ C3	6209ZZ C3	6309ZZ C3	6209ZZ C3
180	ALL	6310ZZ C3	6210ZZ C3	6310ZZ C3	6210ZZ C3
200	ALL	6312 C3	6310ZZ C3	6312 C3	6310ZZ C3
225 S	ALL	6313 C3	6312 C3	6313 C3	6312 C3
225 M	ALL	6313 C3	6313 C3	6313 C3	6313 C3
250	ALL	6314 C3	6313 C3	6314 C3	6313 C3
280	ALL	6317 C3	6314 C3	6317 C3	6317 C3
315 S/M1	2	6317 C3	6316 C3	6317 C3	6316 C3
315 S/M1	4,6,8	6319 C3	6316 C3	6319 C3	6316 C3
315 M2/L	2	6317 C3	6217 C3	6317 C3	6317 C3
315 M2/L	4,6,8	6319 C3	6319 C3	6319 C3	6319 C3
355 S/M&L	4,6,8	N321	6321 C3	N321	6321 C3



**Lubrication**

Lubrication points are included as standard for entire range of motors. Regreasing intervals depend on bearing size and speed. General guideline for regreasing interval is given in Table 5.

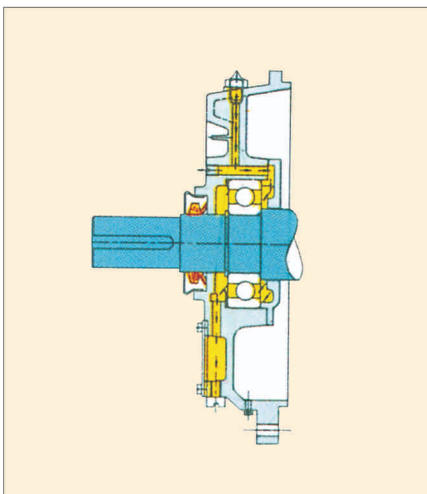
However for specific requirements our works may be referred.

**TABLE - 5**

**Recommended Regreasing Interval**

Frame size	Poles	Recommended regreasing interval (in hours)
200-225	2	3100
	4-8	7000
250-280	2	1200
	4-8	5000
315	2	1200
	4-8	4500
355	4-8	3000

Grease relief arrangement is provided as standard for frame sizes D200 and above.



*Grease Entry & Relief Arrangement for Challenger Series Motor*

The bearings are lubricated with premium grade lithium based grease VEEDOL make (ALITHEX 10 or 20) which has EP additive having high load carrying capacity, rust inhibition properties, oxidation and heat stability. The grease is suitable for a temperature range of -20°C to 115°C. Suitable grease for extreme ambient temperature operation can be provided on request.

**Electrical protection**

Standard motors are suited for normal over load/stall protection offered by standard thermal or magnetic over load starters.

Additional thermal protection in the form of built-in thermistors is available at an extra cost. The small thermal mass of the thermistors and their intimate contact achieved by embedding in

winding assures a quick response to changes in winding temperatures. Thermistors are semi conducting resistance devices with positive temperature coefficient. Recommended reference temperatures for thermistors are given in Table 7.

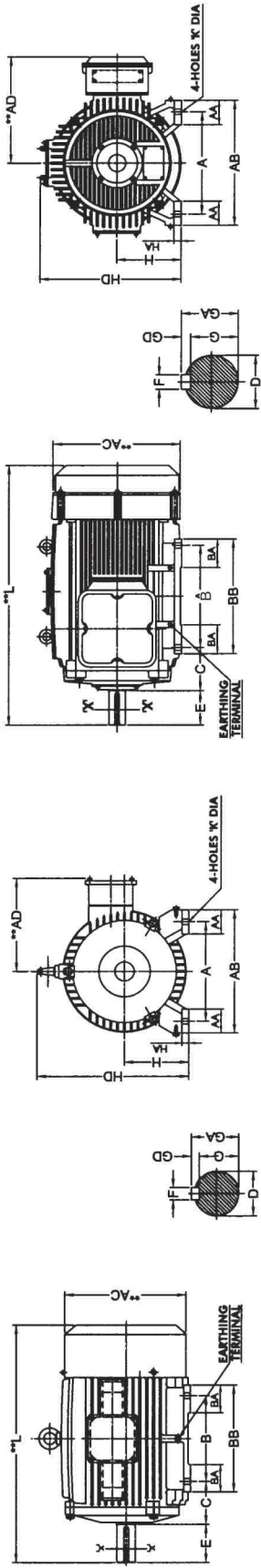
Thermistors are embedded in winding prior to impregnation and terminal leads brought out to a separate/main terminal box for connection to the control devices. RTD/BTD can be provided for frames 280/315/355 frame motors on request.

**TABLE - 7**

**Recommended reference temperatures for Thermistors**

Class of Insulation	Type of Thermistor	
	Warning	Tripping
B	P 120	P 140
F	P 140	P 160





SECTION - "XX"

SECTION - "XX"

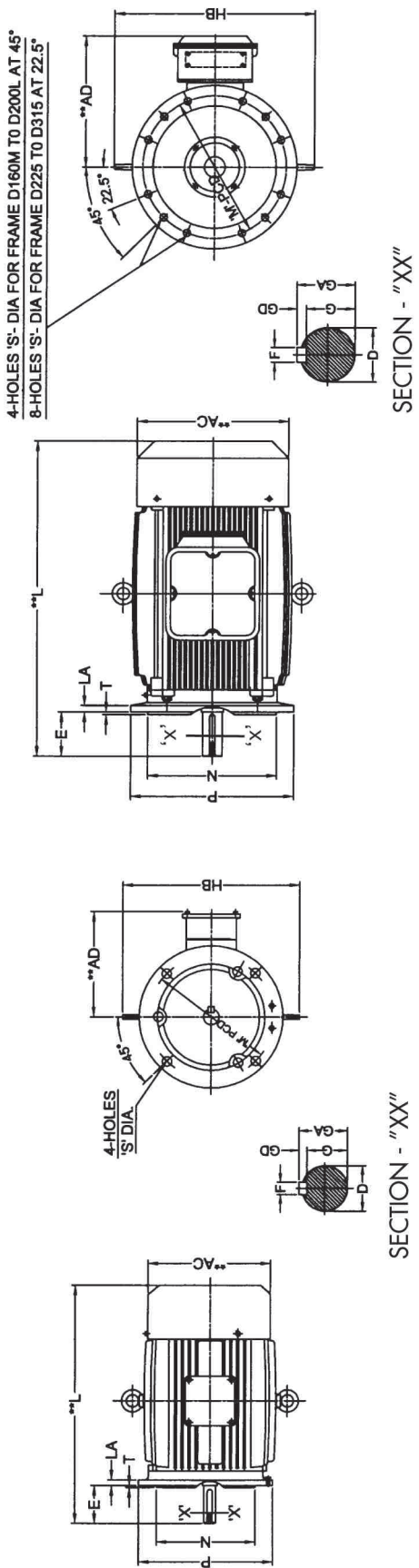
**Foot Mounted**

FRAME SIZE	FIXING														SHAFT						GENERAL								TAPPED CENTRE HOLE AT SHAFT END (AS PER IS:2540)
	A	B	C	H	AB	BB	K	D	E	F	G	GA	GD	**L	AA	**AC	**AD	BA	HA	HD									
D71 (TOP L80V)	112	90	45	71	134	112	7	14	30	5	11	16	5	250	27	135	125	26	8	—									
D80	125	100	50	80	156	125	10	19	40	6	15.5	21.5	6	298	34	167	144	32.5	12	220									
D90S	140	100	56	90	170	130	10	24	50	8	20	27	7	310	35	187	152	40	12	236									
D90L	140	125	56	90	170	155	10	24	50	8	20	27	7	335	35	187	152	45	12	236									
D100L	160	140	63	100	192	170	12	28	60	8	24	31	7	374	38	220	175	50	12	263									
D112M	190	140	70	112	222	170	12	28	60	8	24	31	7	390	45	220	180	50	14	284									
D132S	216	140	89	132	256	184	12	38	80	10	33	41	8	458	50	260	205	57	14	317									
D132M	216	178	89	132	256	222	12	38	80	10	33	41	8	500	50	260	205	57	14	317									
D160M	254	210	108	160	300	300	15	42	110	12	37	45	8	670	60	316	300	100	20	381									
D160L	254	254	108	160	300	300	15	42	110	12	37	45	8	670	60	316	300	100	20	381									
D180M	279	241	121	180	344	330	15	48	110	14	42.5	51.5	9	750	65	345	315	90	25	422									
D180L	279	279	121	180	344	330	15	48	110	14	42.5	51.5	9	795	65	345	315	90	25	422									
D200L	318	305	133	200	390	356	19	55	110	16	49	59	10	830	88	390	395	88	35	460									
D225S	356	286	149	225	444	375	19	60	140	18	53	64	11	860	88	390	395	95	35	485									
D225M	356	311	149	225	444	375	19	60	140	18	53	64	11	830	88	390	395	95	35	485									
D225M	356	311	149	225	444	375	19	60	140	18	53	64	11	860	88	390	395	95	35	485									
D250M	406	349	168	250	508	420	24	60	140	18	53	64	11	935	108	459	425	100	40	517									
D250M	406	349	168	250	508	420	24	65	140	18	58	69	11	935	108	459	425	100	40	517									
D280S	457	368	190	280	560	490	24	65	140	18	58	69	11	1110	112	544	460	120	42	620									
D280M	457	368	190	280	560	490	24	65	140	18	58	69	11	1110	112	544	460	120	42	620									
D280M	457	419	190	280	560	490	24	75	140	20	67.5	79.5	12	1110	112	544	460	120	42	620									
D315S	508	406	216	315	620	520	28	80	170	22	71	85	14	1190	120	598	605	143	50	710									
D315M1	508	406	216	315	620	520	28	80	170	22	71	85	14	1220	120	598	605	143	50	710									
D315M2	508	457	216	315	620	520	28	80	170	22	71	85	14	1220	120	598	605	143	50	710									
D315M2	508	457	216	315	620	570	28	80	170	22	71	85	14	1280	120	664	630	143	50	742									
D315L	508	508	216	315	620	570	28	80	170	22	71	85	14	1310	120	664	630	143	50	742									
D315L	508	508	216	315	620	570	28	80	170	22	71	85	14	1280	120	664	630	143	50	742									
D355S (4 POLE & ABOVE)	610	500	254	355	720	650	28	95	170	25	86	100	14	1310	120	664	630	143	50	742									
D355M (4 POLE & ABOVE)	610	560	254	355	720	650	28	95	170	25	86	100	14	1430	140	740	675	160	45	820									
D355L (4 POLE & ABOVE)	610	630	254	355	720	720	28	95	170	25	86	100	14	1430	140	740	675	160	45	820									
D355L (4 POLE & ABOVE)	610	630	254	355	720	720	28	95	170	25	86	100	14	1570	140	740	675	160	45	820									

\*\*2 POLE MOTORS ONLY  
\*\* DIMENSIONS ARE MAXIMUM VALUES

ALL DIMENSIONS ARE IN MM





**Flange Mounted**

FRAME SIZE	FIXING				SHAFT				GENERAL				TAPPED CENTRE HOLE AT SHAFT END (AS PER IS:2540)			
	S	M	N	P	D	E	F	GA	GD	G	**AC	**AD		**HB	**L	LA
D71	10	130	110	160	14	30	5	16	5	11	135	125	-	270	9	3.0
D80	12	165	130	200	19	40	6	21.5	6	15.5	167	144	266	298	10	3.5
D90S	12	165	130	200	24	50	8	27	7	20	187	152	286	367	10	3.5
D90L	12	165	130	200	24	50	8	27	7	20	187	152	286	367	10	3.5
D100L	15	215	180	250	28	60	8	31	7	24	220	175	318	374	11	4
D112M	15	215	180	250	28	60	8	31	7	24	220	180	318	390	11	4
D132S	15	265	230	300	38	80	10	41	8	33	260	205	360	458	12	4
D132M	15	265	230	300	38	80	10	41	8	33	260	205	360	500	12	4
D160M/L	19	300	250	350	42	110	12	45	8	37	316	300	456	670	13	5
D180M/L	19	300	250	350	48	110	14	51.5	9	42.5	345	315	544	750	13	5
D200L	19	350	300	400	55	110	16	59	10	49	390	395	658	795	15	5
D225S	19	400	350	450	*55	110	16	59	10	49	*390	395	658	830	16	5
D225M	19	400	350	450	60	140	18	64	11	53	390	395	658	860	16	5
D225M	19	400	350	450	*55	110	16	59	10	49	*459	425	658	900	16	5
D250M	19	400	350	450	60	140	18	64	11	53	459	425	658	930	16	5
D250M	19	500	450	550	*60	140	18	64	11	53	459	425	700	935	18	5
D250M	19	500	450	550	65	140	18	69	11	58	459	425	700	935	18	5
D280S/M	19	500	450	550	*65	140	18	69	11	58	*544	460	690	1110	18	5
D280S/M	19	500	450	550	75	140	20	79.5	12	67.5	544	460	690	1110	18	5
D315S/M1	24	600	550	660	*65	140	18	69	11	58	*598	605	710	*1180	22	6
D315S/M1	24	600	550	660	80	170	22	85	14	71	598	605	710	1210	22	6
D315M2/L	24	600	550	660	*65	140	18	69	11	58	*664	630	860	*1280	22	6
D315M2/L	24	600	550	660	80	170	22	85	14	71	664	630	860	1310	22	6
D355S/M1/4	24	740	680	800	95	170	25	100	14	86	740	675	890	1430	25	6
POLE & ABOVE																
D355M/L1/4	24	740	680	800	95	170	25	100	14	86	740	675	890	1570	25	6
D355M/L1/4	24	740	680	800	95	170	25	100	14	86	740	675	890	1570	25	6

\*2 POLE MOTORS ONLY  
\*\* DIMENSIONS ARE MAXIMUM VALUES  
ALL DIMENSIONS ARE IN MM

## Performance Chart

Ambient Temperature - 50°C  
Degree of protection - IP55

Supply Condition :3 phase, 415V±10%,  
50 HZ ± 5%

Class of Insulation - 'F'  
Temperature rise limit - Class 'B' (70°C)

Frame Size IEC	Output kW	Full Load RPM	Rated Current (Amps)	Efficiency			Power Factor			STG. Current (x FLC)	STG. Torque (x FLT)	P.O.T. (x FLT)	GD <sup>2</sup> Kg m <sup>2</sup>	Weight (Kg)
				100%	75%	50%	100%	75%	50%					
<b>2 Pole</b>														
D71	0.37	2800	0.92	68	65	55	0.82	0.65	0.5	4.9	2.2	2.3	0.0023	13.4
D71	0.55	2800	1.31	71	69	65	0.82	0.68	0.51	4.9	2.2	2.4	0.0023	13.4
D80	0.75	2750	1.66	73	73.5	73	0.86	0.85	0.79	5.0	2.1	2.4	0.0038	18
D80	1.1	2750	2.3	74	75	74.5	0.90	0.80	0.80	5.5	2.2	2.5	0.0063	23
D90S	1.5	2850	3.15	78	73	68	0.85	0.79	0.68	6.0	2.0	2.5	0.0083	25
D90L	2.2	2830	4.6	78	74	72	0.86	0.81	0.70	6.0	2.1	2.6	0.018	36
D100L	3.7	2850	7.2	81	78	74	0.88	0.86	0.83	6.0	2.0	2.6	0.027	42
D132S	5.5	2850	10.4	85.7	82	79	0.86	0.80	0.70	6.0	2.1	2.6	0.0534	64
D132S	7.5*	2850	14.3	86	83	80	0.85	0.79	0.72	6.0	2.3	2.8	0.0725	69
D160M	11.0	2900	20.5	86	85	83	0.87	0.84	0.76	6.0	1.9	2.7	0.108	128
D160M	15.0	2880	27.6	87	86	84	0.87	0.86	0.80	6.0	1.9	2.7	0.135	136
D160L	18.5	2920	33.2	89	88	86	0.87	0.85	0.78	6.0	2.0	2.7	0.188	165
D180M	22.0	2930	38.6	90	89	87	0.88	0.86	0.74	6.0	1.8	2.7	0.225	172
D200L	30.0	2940	53.3	90	88	86	0.87	0.84	0.76	6.0	1.8	2.7	0.49	277
D200L	37.0	2950	65	91	89.5	86	0.87	0.83	0.74	6.0	1.8	2.7	0.61	320
D225M	45.0	2955	78.2	91	90	87	0.88	0.86	0.80	6.0	1.8	2.7	0.93	379
D250M	55	2955	94	92	91	88	0.885	0.875	0.81	6.0	1.8	2.7	1.11	439
D280S	75*	2960	127	93	92	89	0.885	0.87	0.78	6.0	1.8	2.7	2.07	724
D280M	90*	2965	152	93	92	89	0.885	0.86	0.78	6.0	1.8	2.7	2.35	754
D315S	110	2970	185	93	92	90	0.89	0.87	0.80	6.0	1.6	2.7	4.1	815
D315M2	132	2975	220	93.5	92.5	90	0.89	0.86	0.78	6.5	1.7	2.7	4.6	1100
D315M2/ D315LA	160	2975	265	94	93	92	0.895	0.88	0.82	6.5	1.6	2.7	7.7	1190
D315LB #	180	2975	299	94.2	93.1	92	0.89	0.87	0.81	6.5	1.6	2.8	8.9	1210
D315LC #	200	2975	335	94.4	93.2	92	0.88	0.87	0.81	6.5	1.6	2.8	8.9	1210

Frame Size IEC	Output kW	Full Load RPM	Rated Current (Amps)	Eff. Class	Efficiency			Power Factor			STG. Current (x FLC)	STG. Torque (x FLT)	P.O.T. (x FLT)	GD <sup>2</sup> Kg m <sup>2</sup>	Weight (Kg)
					100%	75%	50%	100%	75%	50%					
<b>4 Pole</b>															
D71	0.25	1340	0.8	-	60	59	54	0.72	0.68	0.54	4.0	2	2.25	0.0023	13.3
D71	0.37	1380	1.08	2	68	66	62	0.7	0.65	0.52	4.5	2	2.3	0.0023	13.3
D80	0.55	1400	1.48	2	70	68	65	0.74	0.65	0.50	4.50	2	2.5	0.0064	16.4
D80	0.75	1400	1.93	2	73	70	67	0.74	0.65	0.53	5.0	2.2	2.5	0.0064	16.4
D90S	1.1	1410	2.6	2	76.2	70	67	0.78	0.70	0.61	5.0	2	2.5	0.0136	21.5
D90L	1.5	1410	3.4	2	78.5	72	67	0.79	0.76	0.60	5.5	2.1	2.5	0.0156	25
D100L	2.2	1430	4.6	2	81	78	76	0.82	0.75	0.62	6.0	1.9	2.5	0.0392	34
D112M	3.7	1430	7.5	2	84	81	80	0.82	0.77	0.70	6.0	2.1	2.6	0.0516	42
D132S	5.5	1440	10.7	2	85.8	85	82	0.83	0.75	0.62	6.0	2.2	2.7	0.124	64
D132M	7.5*	1440	14.5	2	87	84	82	0.83	0.78	0.70	6.0	2.0	2.7	0.135	71
D160M	11	1450	20.1	2	88.5	88.5	87.5	0.86	0.84	0.76	6.0	2.2	2.7	0.177	126
D160LA	15*	1455	27.3	-	88.8	89	88	0.86	0.84	0.76	6.0	2.2	2.7	0.238	136
D160LB	15	1460	27.1	2	89.5	89	88	0.86	0.84	0.76	6.0	2.2	2.7	0.26	140
D180M	18.5	1460	33.5	2	90.5	90	89	0.85	0.82	0.78	6.0	2.2	2.7	0.416	166
D180L	22	1460	39.0	2	91	90.5	89.5	0.87	0.85	0.79	6.0	2.2	2.7	0.504	174
D200L	30	1470	52.4	2	92.5	91	89.0	0.86	0.83	0.78	6.0	2.3	2.7	0.853	277
D225S	37	1470	65.0	2	92.5	92	90	0.86	0.82	0.72	6.0	2.3	2.7	1.001	315
D225M	45	1475	78.0	2	92.7	92	90.5	0.87	0.85	0.78	6.0	2.3	2.7	1.850	385
D250M	55	1470	96.0	2	93	92.3	90.5	0.86	0.85	0.78	6.0	2.4	2.7	2.252	450
D280S	75*	1480	128	2	93.6	92.8	91	0.87	0.84	0.77	6.0	2.2	2.7	3.789	710
D280M	90*	1480	153	2	93.9	93.3	91	0.87	0.84	0.76	6.0	2.2	2.7	4.601	758
D315S	110	1485	190.5	2	94.5	93.3	91.2	0.85	0.82	0.74	6.0	2.2	2.5	7.385	836
D315M1	132	1485	228	2	94.7	93.7	92	0.85	0.81	0.75	6.0	2.2	2.5	8.205	876
D315M2/ D315LA	160	1485	272	2	95	94	92	0.86	0.82	0.75	6.5	1.8	2.5	10.434	1225
D315LB	180	1485	305	-	95	94.2	92.5	0.865	0.83	0.76	6.5	1.8	2.6	11.2	1260
D315LC #	200	1486	342	-	95.8	95.6	93.5	0.85	0.81	0.7	6.0	1.6	2.6	12.2	1300
D355S	200	1488	340	-	95.3	94.5	92.5	0.86	0.83	0.76	6.0	2.0	2.5	20.6	1500
D355M	220	1488	368	-	95.5	95.0	93.0	0.87	0.84	0.74	6.0	2.0	2.5	21.55	1600
D355MB	250	1488	417	-	95.8	95.3	94.0	0.87	0.84	0.77	6.0	2.0	2.5	23.4	1650
D355LA	280	1487	461	-	96	96	94	0.88	0.86	0.8	6.0	1.8	2.4	25.29	1900
D355LB	315	1487	517	-	96.3	96	94	0.88	0.86	0.78	6.0	2.0	2.5	29	1980
D355LC	350	1488	577	-	96	96	94	0.88	0.86	0.81	6.0	2.0	2.5	32.3	2100
D355LD #	380	1488	626	-	96	96	94.5	0.88	0.87	0.81	6.0	2.1	2.5	34.6	2160
D355LE #	400	1487	659	-	96	95.5	94	0.88	0.87	0.81	6.0	1.9	2.4	36.5	2350

# For GAD refer to works.

\* Exceptions : Suitable for 45°C ambient temperature / 75°C temp. rise.



## Performance Chart

Ambient Temperature - 50°C  
Degree of protection - IP55

Supply Condition :3 phase, 415V±10%,  
50 HZ ± 5%

Class of Insulation - 'F'  
Temperature rise limit - Class 'B' (70°C)

Frame Size IEC	Output kW	Full Load RPM	Rated Current (Amps)	Eff. Class	Efficiency			Power Factor			STG. Current (x FLC)	STG. Torque (x FLT)	P.O.T. (x FLT)	GD <sup>2</sup> Kg m <sup>2</sup>	Weight (Kg)
					100%	75%	50%	100%	75%	50%					

### 6 Pole

D80	0.55	905	1.7	2	68	63	60	0.66	0.62	0.50	4.5	1.8	2.3	0.0069	18
D90S	0.75	910	1.9	2	72	70	67	0.75	0.69	0.53	5.0	1.7	2.2	0.0105	23
D90L	1.1	910	3	2	74	72.5	70	0.68	0.64	0.53	5.0	1.9	2.3	0.014	25
D100L	1.5	920	3.5	2	76	74	73	0.79	0.75	0.62	5.0	1.8	2.3	0.04	37
D112M	2.2	925	4.9	2	79	79	77	0.80	0.75	0.65	5.5	1.8	2.3	0.05	42
D132S	3.7	950	8	2	82.5	78	76	0.77	0.71	0.60	6.0	1.9	2.5	0.105	68
D132M	5.5	950	11.9	2	83	82	79	0.77	0.72	0.60	6.0	2.0	2.6	0.15	73
D160M	7.5	960	15.1	2	86	85	82	0.80	0.74	0.64	5.5	2.15	2.5	0.263	135
D160L	11.0	960	22	2	87.5	86	83.5	0.79	0.72	0.61	6.0	2.1	2.5	0.299	140
D180L	15.0	965	28.3	2	89	88	85	0.83	0.78	0.66	6.0	2.0	2.5	0.647	208
D200L	18.5	975	35.8	2	89.5	88.5	86	0.81	0.76	0.68	6.0	2.0	2.5	0.954	277
D200L	22.0	975	41.8	2	90	89	86	0.82	0.78	0.70	6.0	2.0	2.5	1.105	290
D225M	30.0	980	55.0	2	91	90.5	88	0.83	0.80	0.69	6.0	2.3	2.5	2.819	377
D250M	37.0	980	68.0	2	92	91	88.5	0.83	0.80	0.72	6.0	2.4	2.5	3.431	437
D280S	45.0	980	81	2	93	92.5	89	0.83	0.79	0.70	6.0	2.2	2.5	4.811	716
D280M	55.0	980	99.0	2	93.5	93	88.5	0.83	0.79	0.69	6.0	2.2	2.5	5.891	728
D315S	75.0	985	133.0	2	93.5	92.5	90.5	0.84	0.82	0.72	6.0	1.8	2.5	8.388	1100
D315M1	90.0	985	157.0	2	94	93	91	0.85	0.83	0.76	6.0	1.8	2.5	9.653	1197
D315M2	110	985	191.0	2	94.5	94	91.5	0.85	0.81	0.74	6.0	1.8	2.5	14.167	1230
D315LA	132	987	229.0	2	94.5	94	91.5	0.85	0.81	0.73	6.0	2	2.5	17.15	1280
D355S	160	990	274.0	-	94.5	94	92.0	0.86	0.82	0.74	6.0	1.8	2.5	30.00	1500
D355M	180	990	311.0	-	94.6	94.2	92.5	0.85	0.82	0.74	6.0	1.7	2.5	33.6	1600
D355M	200	990	329	-	96	95.5	94.5	0.88	0.86	0.77	6.0	1.7	2.6	37.2	1800
D355LA	220	988	375	-	95	94.5	92.5	0.86	0.84	0.75	6.0	1.5	2.7	41.5	1880
D355LB	250	990	419	-	95.5	95	93.5	0.87	0.84	0.77	6.0	1.5	2.5	46.5	1900
D355LC	280	990	461	-	96	95.5	94.5	0.88	0.83	0.77	6.0	1.5	2.6	49.3	2000
D355LD #	300	990	500	-	96	95.5	94.5	0.87	0.83	0.76	6.0	1.6	2.6	52.9	2050
D355LE #	315	990	537	-	96	95.8	94	0.85	0.81	0.71	6.0	1.8	2.6	57.0	2350

### 8 Pole

D90S	0.37	680	1.4	2	62	59	55	0.61	0.53	0.42	3.5	1.8	2.2	0.015	23
D90L	0.55	680	1.95	2	67	61	57	0.60	0.54	0.40	3.5	1.9	2.4	0.018	25
D100LA	0.75	700	2.37	2	70	62	58	0.64	0.61	0.58	4.5	1.8	2.2	0.045	37
D100LB	1.1	700	3.3	-	70	67	61	0.67	0.60	0.45	4.5	1.7	2.2	0.045	37
D100LC	1.1	700	3.2	2	72	67	61	0.67	0.60	0.45	4.5	1.7	2.2	0.055	41
D112M	1.5	700	4.1	2	74	71	65	0.68	0.60	0.48	4.5	1.9	2.2	0.055	42
D132S	2.2	720	5.7	2	79	75	71	0.69	0.60	0.48	5.0	1.8	2.5	0.12	65
D160M	3.7	720	9.0	1	83	82	78	0.69	0.63	0.50	5.0	1.9	2.3	0.263	135
D160M	5.5	720	13.0	2	84	83	81	0.70	0.65	0.55	5.5	2.0	2.4	0.303	137
D160L	7.5	720	17.0	2	85	83	80	0.72	0.65	0.55	5.5	1.9	2.4	0.384	140
D180L	11.0	725	24.4	2	86	85	83	0.73	0.68	0.58	5.0	2.0	2.4	0.647	208
D200L	15.0	725	32.5	2	88	87	85	0.73	0.69	0.58	5.0	1.8	2.3	0.954	277
D225S	18.5	725	40.0	2	88	87	85	0.73	0.66	0.58	5.0	2.2	2.5	1.127	315
D225M	22.0	730	46.5	2	89	88	86	0.74	0.68	0.58	5.5	2.2	2.6	2.819	377
D250M	30.0	730	61.8	2	90	89.5	87	0.75	0.67	0.61	6.0	2.0	2.5	3.431	437
D280S	37.0	740	71.7	1	92	91.5	88	0.78	0.70	0.64	6.0	2.0	2.5	4.811	716
D280M	45.0	738	87.2	2	92	91	89	0.78	0.70	0.64	6.0	2.1	2.5	5.891	728
D315S	55.0*	740	107.4	2	92.5	91.5	90	0.77	0.72	0.64	6.0	2.0	2.5	8.388	1050
D315M	75.0*	740	146.5	2	92.5	91.3	90	0.77	0.72	0.63	6.0	2.0	2.4	9.653	1095
D315LA	90.0*	740	167.6	2	93.5	93	91	0.80	0.75	0.65	6.0	2.0	2.4	18.90	1100
D315LB	110.0	740	204.2	2	94	93.5	92	0.81	0.78	0.65	6.0	2.0	2.4	22.80	1150
D355S	132	742	237	-	94.5	94.0	92	0.82	0.80	0.71	6.0	2.0	2.5	30.0	1500
D355MA	150	742	276	-	94.5	94	92	0.80	0.75	0.65	6.0	2.0	2.5	34.2	1650
D355MB	160	742	294.4	-	94.5	94	92	0.8	0.75	0.65	6.0	1.8	2.7	37.1	1720
D355LA	180	742	331	-	94.5	94.5	92	0.8	0.74	0.63	6.0	2	2.6	43.7	1810
D355LB	200	742	359	-	95.2	95.2	93.5	0.81	0.77	0.66	6.0	2	2.6	47.3	1880
D355LC #	220	743	397	-	95.3	95.3	93	0.81	0.78	0.67	6.0	2.1	2.6	52.4	1980

# For GAD refer to works.

\* Exceptions : Suitable for 45½ C ambient temperature / 75°C temp. rise.

## Performance Chart

Ambient Temperature - 50°C  
Degree of protection - IP55

Supply Condition :3 phase, 415V±10%,  
50 HZ ± 5%

Class of Insulation - 'F'  
Temperature rise limit - Class 'B' (70°C)

Frame Size IEC	Output kW	Full Load RPM	Full Load Amps	Eff. Class	Efficiency			Power Factor			STG. Current (x FLC)	STG. Torque (x FLT)	P.O.T. (x FLT)	Rotor GD <sup>2</sup> Kg m <sup>2</sup>	Motor Weight (Kg)
					100%	75%	50%	100%	75%	50%					
<b>2 Pole</b>															
SE90S	1.5	2860	2.9	1	84.5	84.0	82.0	0.85	0.76	0.68	6.5	3.0	3.7	0.0104	36
SE90L	2.2	2860	4.1	1	85.6	85.6	82.5	0.87	0.82	0.70	7.0	3.2	3.8	0.0146	41
SE100L	3.7	2870	6.5	1	87.6	87.6	84.5	0.91	0.90	0.88	7.0	2.5	3.8	0.042	50
SE132S	5.5	2880	9.6	1	88.6	88.6	85.0	0.90	0.88	0.87	6.0	2.2	2.8	0.0725	69
SE132S	7.5	2910	13.0	1	89.5	89.5	88.0	0.90	0.88	0.83	7.0	2.6	3.5	0.0936	77
SE160M	9.3	2920	15.7	1	90.5	90.0	87.0	0.91	0.90	0.88	6.5	2.2	3.2	0.188	165
SE160M	11	2910	18.6	1	90.5	90.0	87.0	0.91	0.90	0.88	6.0	2.1	2.8	0.188	165
SE160M	15	2930	25.4	1	91.3	90.5	88.0	0.90	0.88	0.81	6.0	1.8	2.7	0.225	170
SE160L	18.5	2930	30.4	1	92.0	91.8	89.0	0.92	0.90	0.86	7.0	2.1	2.7	0.225	170
SE180M	22	2960	37.7	1	92.2	91.2	88.0	0.88	0.86	0.80	6.5	2.2	2.8	0.49	236
SE200L	30	2965	49.3	1	93.0	92.0	89.0	0.91	0.90	0.86	7.0	2.0	2.8	0.93	340
SE200L	37	2965	61.3	1	93.3	92.5	89.5	0.90	0.89	0.85	6.5	1.7	2.7	0.93	340
SE225M	45	2955	74.2	1	93.7	93.3	91.0	0.90	0.89	0.85	6.0	1.6	2.7	1.56	465
SE250M	55	2960	91.4	1	94	93.5	91.5	0.89	0.88	0.82	7.0	1.8	2.8	1.95	515
SE280S	75	2970	124	1	94.6	94.0	92.0	0.89	0.86	0.79	6.5	1.75	2.8	3.65	900
SE280M	90	2970	146	1	95.0	94.3	92.0	0.90	0.88	0.83	6.5	1.6	2.8	4.1	940
SE315S	110	2970	179	1	95.0	94.5	92.5	0.90	0.89	0.86	6.0	1.5	2.65	4.6	856
SE315M	132	2975	214	1	95.3	94.3	92.5	0.90	0.89	0.85	6.0	1.65	2.7	7.7	1190
SE315L	160	2975	256	1	95.5	95.0	93.0	0.91	0.90	0.87	6.0	1.6	2.5	8.9	1210

### 4 Pole

SE90S	1.1	1420	2.35	1	83.8	83.8	81.0	0.78	0.69	0.55	6.0	2.2	2.8	0.0156	25
SE90L	1.5	1430	3.15	1	85	85	82	0.78	0.69	0.55	6.0	2.4	3.0	0.0187	26
SE100L	2.2	1430	4.0	1	87	87	85	0.84	0.80	0.65	7.0	2.7	3.6	0.0516	40
SE112M	3.7	1440	6.9	1	88.3	88.3	86.0	0.85	0.81	0.69	7.0	2.0	3.0	0.051	56
SE132S	5.5	1450	10.0	1	89.2	89.2	86.5	0.85	0.80	0.68	6.0	2.2	2.7	0.146	71
SE132M	7.5	1450	13.4	1	90.5	90.5	88.0	0.86	0.84	0.75	6.0	2.2	2.7	0.137	96
SE160M	9.3	1465	16.5	1	91	91	90	0.86	0.82	0.73	6.5	2.6	3.0	0.238	136
SE160M	11	1455	19.6	1	91	91	90	0.86	0.82	0.73	6.0	2.3	2.7	0.238	136
SE160L	15	1460	27.3	1	91.8	91.8	91.0	0.83	0.81	0.72	6.0	1.8	2.7	0.282	165
SE180M	18.5	1463	31.7	1	92.3	92.3	91.0	0.88	0.86	0.80	6.0	2.2	2.7	0.552	176
SE180L	22	1468	37.4	1	93.0	93.0	92.5	0.88	0.86	0.80	6.0	2.0	2.7	0.575	236
SE200L	30	1474	50.7	1	93.5	93.5	92.5	0.88	0.86	0.81	6.0	2.0	2.7	0.951	365
SE225S	37	1475	62.2	1	94.0	94.0	92.5	0.88	0.86	0.80	6.0	2.0	2.7	1.141	385
SE225M	45	1475	76.6	1	94.0	94.0	92.5	0.87	0.83	0.77	6.0	2.0	2.7	1.427	415
SE250M	55	1480	94.4	1	94.3	94.0	92.5	0.86	0.84	0.76	6.0	2.2	2.7	3.789	515
SE280S	75	1485	128	1	94.7	94.5	93.0	0.86	0.84	0.76	6.5	2.2	2.7	5.846	720
SE280M	90	1485	151.5	1	95.0	95.0	93.5	0.87	0.84	0.76	6.5	2.2	2.7	7.385	740
SE315S	110	1485	183	1	95.3	95.3	94.5	0.88	0.82	0.80	6.5	2.2	2.8	8.205	880
SE315M	125	1485	207	1	95.6	95.6	94.6	0.88	0.84	0.82	6.0	2.2	2.7	8.205	1150
SE315M	132	1485	220	1	95.6	95.4	94.0	0.87	0.85	0.8	6.0	1.8	2.5	8.69	1190
SE315L	160	1485	264	1	95.8	95.8	94.5	0.88	0.83	0.79	6.0	1.8	2.7	10.434	1225

NOTE : 1. EFF. 1 as per IS:12615-2004

3. In case of 2 pole motors, for ratings 75kW & above, unidirectional fan may be used.

2. For G.A. drg. refer to works.

4. Efficiency figures are without oil seal during testing.



## Performance Chart

Ambient Temperature - 50°C  
Degree of protection - IP55

Supply Condition :3 phase, 415V±10%,  
50 HZ ± 5%

Class of Insulation - 'F'  
Temperature rise limit - Class 'B' (70°C)

Frame Size IEC	Output kW	Full Load RPM	Full Load Amps	Eff. Class	Efficiency			Power Factor			STG. Current (x FLC)	STG. Torque (x FLT)	P.O.T. (x FLT)	Rotor GD <sup>2</sup> Kg m <sup>2</sup>	Motor Weight (Kg)
					100%	75%	50%	100%	75%	50%					
<b>6 Pole</b>															
SE90S	0.75	915	1.8	1	74.6	74.6	70	0.77	0.74	0.62	5.0	1.7	2.3	0.014	25
SE90L	1.1	915	2.7	1	77.3	77.3	72.5	0.74	0.68	0.57	5.0	1.8	2.3	0.0168	28
SE100L	1.5	925	3.2	1	79.6	79.6	74.0	0.82	0.77	0.65	5.5	2.0	2.5	0.050	42
SE112M	2.2	925	4.5	1	82.2	82.2	75.0	0.82	0.80	0.70	5.5	2.0	2.5	0.058	45
SE132S	3.7	955	7.6	1	85.1	84.0	78.0	0.80	0.76	0.66	6.0	1.8	2.8	0.150	73
SE132M	5.5	955	11.0	1	86.8	86.0	80.0	0.80	0.76	0.66	6.0	1.8	2.8	0.168	77
SE160M	7.5	965	14.6	1	88.5	88.1	83.0	0.81	0.76	0.66	6.0	2.2	2.7	0.299	140
SE160L	9.3	965	17.7	1	89.3	88.5	84.5	0.82	0.80	0.72	6.0	2.2	2.7	0.346	147
SE160L	11.0	965	20.8	1	89.7	89	85	0.82	0.79	0.72	6.0	2.4	2.8	0.378	149
SE180L	15.0	970	27.6	1	91.0	91.0	89.0	0.83	0.78	0.68	6.0	2.0	2.7	1.105	235
SE200L	18.5	975	33.9	1	91.5	91.5	90.5	0.83	0.80	0.71	6.0	2.1	2.6	1.205	300
SE200L	22.0	975	40.1	1	91.8	91.8	90.5	0.83	0.80	0.71	6.0	1.9	2.45	1.205	300
SE225M	30.0	980	54	1	93.0	93.0	92.0	0.83	0.79	0.71	6.0	2.1	2.6	3.431	385
SE250M	37	985	65	1	93.5	93.5	92.0	0.85	0.81	0.71	6.0	2.4	3.0	4.811	515
SE280S	45	990	79.3	1	94.0	93.5	92.0	0.84	0.80	0.68	6.0	1.8	2.7	8.388	830
SE280M	55	990	95.5	1	94.3	94.0	92.5	0.85	0.80	0.73	6.0	1.8	2.7	9.659	855
SE315S	75	990	130	1	94.5	94.5	93.0	0.85	0.82	0.76	6.0	2.2	2.7	11.93	1050
SE315MA	90	988	156	1	94.5	94.0	93.0	0.85	0.82	0.75	6.0	1.8	2.4	14.167	1230
SE135MB	110	985	190	1	94.6	94.0	92.5	0.85	0.81	0.74	6.0	1.8	2.5	14.167	1230
SE315LA	132	990	227	1	95.0	94.5	93.0	0.85	0.82	0.74	6.0	2.0	2.4	17.89	1300
SE355S	160	990	272	1	95.2	95.0	93.0	0.86	0.82	0.73	6.0	1.7	2.5	33.6	1600

- NOTE : 1. EFF. 1 as per IS:12615-2004  
2. For G.A. drg. refer to works.  
3. Efficiency figures are without oil seal during testing.  
4. for 8 pole details, please refer to works.

### 4 Pole Challenger+

D80	0.55	1400	1.34	2	73	73	65	0.78	0.7	0.56	4.5	2	2.5	0.0064	16.4
D80	0.75	1400	1.8	2	75	74	70	0.78	0.7	0.56	5	2.2	2.5	0.0064	16.4
D90S	1.1	1410	2.5	2	77	76	70	0.8	0.74	0.61	5	2	2.5	0.0136	21.5
D90L	1.5	1410	3.3	2	78.5	78	75	0.8	0.76	0.6	5.5	2.1	2.5	0.0156	25
D100L	2.2	1430	4.6	2	82	81	78	0.82	0.75	0.62	6	1.9	2.5	0.0392	34
D112M	3.7	1430	7.0	2	86	86	83	0.86	0.84	0.80	6	2.1	2.6	0.0594	44
D132S	5.5	1440	10.7	2	86	86	83	0.83	0.75	0.62	6	2.2	2.7	0.124	64
D132M	7.5	1440	13.6	2	88	88	86	0.87	0.82	0.72	6	2	2.7	0.147	73
D160M	9.3	1445	17	2	88.5	88.5	86.5	0.86	0.84	0.76	6	2.2	2.7	0.177	126
D160M	11	1450	20	2	89	89	87.5	0.86	0.84	0.76	6	2.2	2.7	0.177	126
D160L	15	1460	26.3	2	90	90	88	0.88	0.86	0.76	6	2.2	2.7	0.26	140
D180M	18.5	1460	32.9	2	91	91	90	0.86	0.82	0.78	6	2.2	2.7	0.452	170
D180L	22	1460	38.4	2	91.5	91.5	90	0.87	0.85	0.79	6	2.2	2.7	0.552	180
D200L	30	1470	51.2	2	92.6	92.6	91	0.88	0.86	0.78	6	2.3	2.7	0.931	284
D225S	37	1470	64.4	2	93	93	91	0.86	0.82	0.72	6	2.3	2.7	1.078	322
D225M	45	1475	76	2	93.5	93.5	92	0.88	0.86	0.78	6	2.3	2.7	2.01	392
D250M	55	1470	92.7	2	93.8	93.5	91	0.88	0.85	0.78	6	2.4	2.7	2.413	458
D280S	75	1480	126	2	94.2	94	92	0.88	0.84	0.77	6	2.2	2.7	4.059	720
D280M	90	1485	151	2	94.3	94	92.5	0.88	0.86	0.76	6	2.2	2.7	4.87	768
D315S	110	1485	187	1	95.2	94.5	92.5	0.86	0.82	0.74	6.5	2.2	2.5	8.206	866
D315M1	125	1485	217	2	94.5	93.7	92	0.85	0.8	0.72	6.5	2.2	2.5	8.205	876
D315M2	132	1485	226	2	95.5	95	94	0.85	0.81	0.75	6	1.7	2.6	8.317	1150
D315M2/															
D315L	160	1485	264	1	95.8	95.5	94	0.88	0.84	0.75	6	1.7	2.7	10.434	1225
D315L	180	1485	303	-	95.5	95	93.5	0.865	0.83	0.76	6.5	1.8	2.6	11.2	1260
D355S	200	1488	330	-	95.6	95	93.5	0.88	0.85	0.78	6	2	2.5	20.6	1500
D355MA	220	1488	368	-	95.6	95	93.5	0.87	0.84	0.74	6	2	2.5	21.55	1600
D355MB	250	1488	417	-	95.8	95.3	94	0.87	0.84	0.77	6	2	2.5	23.4	1650
D355LA	280	1487	461	-	96	96	94	0.88	0.86	0.8	6	1.8	2.4	25.29	1900
D355LB	315	1487	517	-	96.3	96	94	0.88	0.86	0.78	6	2	2.5	29	1980

POLICY : Every care has been taken to ensure the accuracy of the information contained in this publication, but due to policy of continuous development and improvement the right is reserved to supply products which may differ slightly from those illustrated & described in this publication.

## CHALLENGER SERIES - IE2

The New IS:12615 : 2011 is based on the International standard IEC 60034-30 (2008) which defines New Efficiency Classification for single speed, three phase, induction motors. The new IS:12615 covers single speed, three-phase, 50Hz, cage induction motors that:

- have rated voltage " 1000V
- have a rated output 0.37KW " P<sub>N</sub> " 375KW
- have either 2,4 or 6 poles;
- meet frame size to output relation as stipulated in IS:1231 (for outputs covered by IS:1231);
- are rated on the basis of either duty type S1 (continuous duty) or S3 (intermittent periodic duty) with rated cyclic duration factor of 80% or higher,
- are capable of operating direct on-line;
- are designed for operation on virtually sinusoidal and balanced voltage conditions as defined in 7.2.1 of IS/IEC 60034-1;
- designed for an ambient temperature not exceeding 40°C and altitude not exceeding 1000m;
- have degree of protection IP44 or superior;
- have method of cooling IC411 in accordance with IS 6362/IEC 60034-6;
- have service factor not exceeding 1.0

The efficiency classed defined are:

- IE1-Standard Efficiency
- IE2-High Efficiency
- IE3-Premium Efficiency

The New IS:12615 also stipulates that for motors to be classified as "Energy Efficient", these must meet at least IE2 efficiency values.

<b>marathon™</b> <small>A REGAL-BELOIT COMPANY</small>							
<b>IE2</b>							
REF: IEC 60034-1 / IS/IEC:60034-1							
3 PH ~ SQ.CAGE	FRAME						
INDUCTION MOTOR	M/C No.						
INS. CL. IP55							
DUTY -	MFG. YR.   20						
AMB.TEMP. °C	D.E BRG.						
WT. kg.	N.D.E BRG.						
WDG.CONN.-							
V	Hz	KW	HP	AMPS	R.P.M.	%EFF	PF
Marathon Electric Motors (India) Limited Paharpur Works, 58, Taratala Road, Kolkata - 700024 , INDIA							
							DP3073

### Investment & payback period calculations for IE2 motor:

Type of Motor		IE1	IE2
Motor Rating		7.5KW/4 Pole	
Rated output of the motor	KW	7.50	7.50
Efficiency as stipulated in IS-12615, 2011	%	86.0	88.7
Operation of the motors per annum (assuming 16 hours operation per day for working 25 days per month)	Hours	4,800	4,800
Annual Energy Consumption	KWH	41,860	40,586
Annual Energy Saved	KWH	-	1,274
Power Tariff	Rs.	5	5
Annual Energy Bill	Rs.	2,09,300	2,02,930
Saving on Annual Energy Bill	Rs.	-	6,370
Cost of new motor	Rs.	12,055	13,866
Additional Investment for IE2 motor	Rs.	-	1,811
Payback Period over additional investment	Months	-	3.4
Payback Period on full price of IE2 motor	Months	-	26.1



The values of efficiency for motors to classify as IE2 in accordance with the new IS:12615-2011 are as under :

kW	2 Pole		4 Pole		6 Pole	
	Frame Size	Efficiency % IE2	Frame Size	Efficiency % IE2	Frame Size	Efficiency % IE 2
0.37	71	72.2	71	70.1	80	69.0
0.55	71	74.8	80	75.1	80	72.9
0.75	80	77.4	80	79.6	90S	75.9
1.1	80	79.6	90S	81.4	90L	78.1
1.5	90S	81.3	90L	82.8	100L	79.8
2.2	90L	83.2	100L	84.3	112M	81.8
3.7	100L	85.5	112M	86.3	132S	84.3
5.5	132S	87	132S	87.7	132M	86
7.5	132S	88.1	132M	88.7	160M	87.2
11	160M	89.4	160M	89.8	160L	88.7
15	160M	90.3	160L	90.6	180L	89.7
18.5	160L	90.9	180M	91.2	200L	90.4
22	180M	91.3	180L	91.6	200L	90.9
30	200L	92	200L	92.3	225M	91.7
37	200L	92.5	225S	92.7	250M	92.2
45	225M	92.9	225M	93.1	280S	92.7
55	250M	93.2	250M	93.5	280M	93.1
75	280S	93.8	280S	94	315S	93.7
90	280M	94.1	280M	94.2	315M	94
110	315S	94.3	315S	94.5	315M#	94.3
125	315M	94.5	315M	94.5	315M#	94.4
132	315M	94.6	315M	94.7	315L#	94.6
160	315L	94.8	315L	94.9	355L	94.8
200	315L	95	315L/355S	95.1	355L	95
250	355L	95	355M	95.1	355L	95
315	355L	95	355L	95.1	355L	95
355	355L	95	355L	95.1	355L	95
375	355L	95	355L	95.1	355L	95

**Notes :**

1. IS 1231 defines frame size to output co-relation only up to Frame Size 315M
2. Frames beyond 315M are indicated as "preferred" in IS:12615-2011.

**Salient Features of the "new" IE efficiency class motors offered by Marathon :**

Frame Size	71 to 355
Power Range	0.37kW to 375kW (in 4 Pole)
Number of Poles	2, 4, 6
Motor Construction	Refer to pages 2 & 3
Efficiency Classes	IE2
Marking	Ratings covered under IS:12615-2011 will be marked with the appropriate efficiency class
Degree of protection	IP55 as per IS:4691
Voltages	415V as Standard. For other voltages possible please contact nearest sales office
Type of Mounting	Refer to page 3
Cooling Type	IC 411 as per IS:6362. (Totally Enclosed Fan Cooled)
Ambient Condition (Standard)	50°C, Altitude " 1000m
Temperature Class	Class 'F' with temperature rise limited to Class 'B'
Bearing System	Refer to page 5 (generally)
Lubrication System	Regreasable bearings for frames 200 onwards

**marathon**<sup>™</sup>  
Motors



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